

**KAESTNERIELLA ROESLER
(PSOCOPTERA: PERIPSOCIDAE): NEW AND LITTLE
KNOWN SPECIES FROM THE SOUTHWESTERN UNITED
STATES AND MEXICO AND A REVISED SPECIES KEY**

EDWARD L. MOCKFORD AND D. MICHAEL SULLIVAN

Department of Biological Sciences, Illinois State University,
Normal, Illinois 61761

Abstract. — *Kaestneriella fumosa* (Banks) is redescribed based on the type and other material. All records since 1959 are from at least 250 km south of the type locality, and that discrepancy is briefly discussed. *K. tenebrosa* NEW SPECIES is described and differentiated from *K. fumosa*. Its range is primarily north of that of *K. fumosa*, but the two species overlap in west central New Mexico and southeastern Arizona. A new male form is assigned to *K. setosa* Mockford & Wong. A revised species key is included.

Key Words. — Insecta, Psocoptera, Peripsocidae, *Kaestneriella*

Kaestneriella Roesler (1943) was originally based on a single species from Costa Rica. Mockford & Wong (1969) described eight new species from Mexico and Guatemala, and presented a species key. They also noted that *Peripsocus fumosus* Banks, from southwestern Colorado, is a *Kaestneriella*, but this discovery was made after their manuscript had been accepted, and they did not redescribe Banks' species. In extensive psocid collecting throughout southwestern United States, one of us (DMS) has established numerous new records of *K. fumosa* and has found a closely related undescribed species. Here we redescribe *K. fumosa*, describe the new species, and suggest that the male assigned to *K. setosa* Mockford & Wong is not the true male of that species. We describe and figure the presumed male. We have revised the species key to include the new forms described here, as well as *K. similis* Badonnel (1986) described from coastal Jalisco, Mexico, and *K. ecuatoriana* Garcia Aldrete (1989) described from Ecuador.

MATERIALS AND METHODS

We examined 107 adults of *K. fumosa* and 20 adults of *K. tenebrosa*. Two males of *K. setosa* and three associated females were also examined. All of the material except the type (returned to the Museum of Comparative Zoology, Cambridge, Massachusetts) and one female (Canadian National Collection, Ottawa, Ontario) of *K. fumosa* is in the Mockford collection, Illinois State University, Normal, Illinois. The type of *K. tenebrosa* will ultimately be deposited in the Florida State Collection of Arthropods, Gainesville, Florida.

All illustrations were made using a drawing tube or microprojector. A set of standardized measurements for the order is included with the descriptions. Measurements were taken on ten females of each species, five from area of sympatry or parapatry with the sister species and five from areas of allopatry. Four males of *K. fumosa* and the single (presumed) male of the new species were also measured. All measurements were made with a filar micrometer; those for IO/d (least distance between compound eyes divided by transverse eye diameter) and some antennae

Table 1. Measurements (μm), IO/d ratios, and ctenidial counts for species of *Kaestneriella*.

Species and sex		FW	F	T	t_1
<i>K. fumosa</i>	male	3003	525	1057	311
<i>K. fumosa</i>	male	2982	509	1004	298
<i>K. fumosa</i>	male	2601	466	959	281
<i>K. fumosa</i>	male	3096	555	1095	326
<i>K. fumosa</i>	female (type)	2580	457	906	262
<i>K. fumosa</i> females, ($n = 10$)	(Min)	2596	446	883	217
	(Max)	2801	502	984	257
	(\bar{x})	2867.1	474.8	929.8	239.4
	($\sigma n - 1$)	69.01	15.75	26.98	13.01
<i>K. tenebrosa</i>	male	2914	484	938	283
<i>K. tenebrosa</i> females, ($n = 10$)	(Min)	1991	436	789	223
	(Max)	2517	498	950	272
	(\bar{x})	2245.5	459.8	865.6	242.7
	($\sigma n - 1$)	147.65	22.90	55.81	15.31
<i>K. setosa</i>	male	2230	451	844	260

were made on temporary alcohol mounts. All others were made on slide-mounted material. Leg measurements were made condyle to condyle. Color observations were made through a dissecting microscope with direct light on specimens preserved in 80% ethanol.

Abbreviations for measurements and body parts follow Mockford (1989) and are defined as: length divided by width of basal bulge of cell R_5 of forewing (R_5 index) (Mockford & Wong 1969); length of third valvula, or external valve divided by length of second valvula, or dorsal valve (ve/vd) (Badonnel 1986, fig. 64); forewing length (FW); hind femur length (F); hind tibia length (T); length of first and second hind tarsomeres (t_1 , t_2); number of ctenidia, or comb-based setae on first hind tarsomere (t_1 ct); least distance between compound eyes divided by the transverse eye diameter (IO/d); length of first . . . fourth flagellomeres (f_1 . . . f_4).

KAESTNERIELLA ROESLER, 1943

Conspicuous wing ciliation is characteristic of the type species, *K. pilosa* Roesler. Mockford & Wong (1969) modified the original diagnosis to include forms with wing ciliation less conspicuous but which agree with the type in several other seemingly important characters. In all species for which males were available to us (all but *K. pilosa* Roesler and *K. similis* Badonnel) the distal process of the phallosome is bent at an angle of 20–30°, so that a distal portion consisting of one-third to slightly less than one-half the entire length of the process lies above the basal portion. This character has not been reported previously for the genus. It is absent in several species of *Peripsocus* which we have examined.

Kaestneriella fumosa and *K. tenebrosa* require no further modification of the generic diagnosis. They are similar, and their distinction was made in part by morphometric methods based entirely on females (the single male representing *K. tenebrosa* is a tentative assignment which must be confirmed by additional collecting). Females are probably completely separable on the basis of forewing length, but wing length in the Psocoptera is subject to enormous intraspecific variation, especially in females. Although forewing length variation in these species is minor (Table 1), better distinction was required. If forewing length is plotted

Table 1. Extended.

t ₂	t ₁ ct	IO/d	f ₁	f ₂	f ₃	f ₄
148	18	0.83	350	281	247	231
133	18	—	346	257	—	—
124	19	0.96	318	243	215	180
127	21	0.70	398	301	266	227
131	14	3.72	249	191	180	—
122	12	2.85	231	181	166	132
144	16	3.81	290	220	190	156
135.3	13.5	3.25	265.4	201.3	175.0	145.0
7.09	1.27	—	20.23	11.72	7.77	10.00
145	14	1.48	351	268	236	182
129	3	3.40	201	156	134	121
156	17	5.31	264	208	176	150
143.5	9.7	4.02	229.6	176.6	158.3	135.9
7.68	5.12	—	19.49	15.85	14.38	11.12
120	16	0.84	253	192	189	155

against the subgenital plate indentation (Fig. 16, i), the resulting scattergrams (Fig. 2) ($n = 10$, each species) show complete separation. The trend of increasing indentation size with increasing wing length is approximately the same in the two species, but the indentation is much shallower in *K. fumosa* than in *K. tenebrosa*. The clunial protrusion (Fig. 10, p, compare to Fig. 18) also affords partial separation of females, but there is much overlap. The species so assigned are largely, but not completely, allopatric (Fig. 1).

These two species are similar to several other *Kaestneriella* with their forewing ciliation short and sparse (more so in males than in females) and the phallosome parallel-sided. They differ from all other *Kaestneriella* in that the principal endophallic sclerites of the two sides are yoked together by a sclerotic band, and each principal endophallic sclerite bears two blades with a rounded lobe between them rather than three blades or a single hook-shaped structure.

KAESTNERIELLA FUMOSA (BANKS)

Peripsocus fumosus Banks 1903: 237.
Kaestneriella fumosa (Banks), Mockford & Wong 1969: 245.

Types.—Holotype female, southwestern Colorado (Oslar), in Museum of Comparative Zoology, Cambridge, Massachusetts.

Male.—Measurements in Table 1. *Color*: Eyes black; ocellar interval dark brown; remainder of head, antennae, and maxillary palpi dusky brown, paler around ocellar interval and between postclypeal striations, labrum darker. Thorax dusky brown, paler between notal lobes, on large areas of pleura below wing attachments, and on all femora. Forewing (Fig. 7) dusky red-brown, darker on pterostigma except paler at base; a colorless spot before, behind, and just distad of R–M junction and on wing margin distad of vein Cu_{1a}; veins mostly dark brown. Hindwings unmarked, with pale dusky brown wash. Preclunial abdominal segments each with a pale, diffuse purple-brown ring (subcuticular pigment) covering most of segment but broadly interrupted ventrally; remainder of preclunial region colorless in cuticle, with white underlying tissues showing through; clunium, epiproct, paraprocts, hypandrium, and phallosome pale brown, becoming dark brown on heavily sclerotized edges. *Structural characters*: R₅ index = 1.33–1.41 ($\bar{x} = 1.37$, $n = 3$). Phallosome (Fig. 3) broad approximately parallel sided; pore-bearing parameres distinct basally, their tips extending to posterior edge of phallosome frame; pores limited to distal half; apical beak of phallosome relatively long and narrow; distal one-third bent

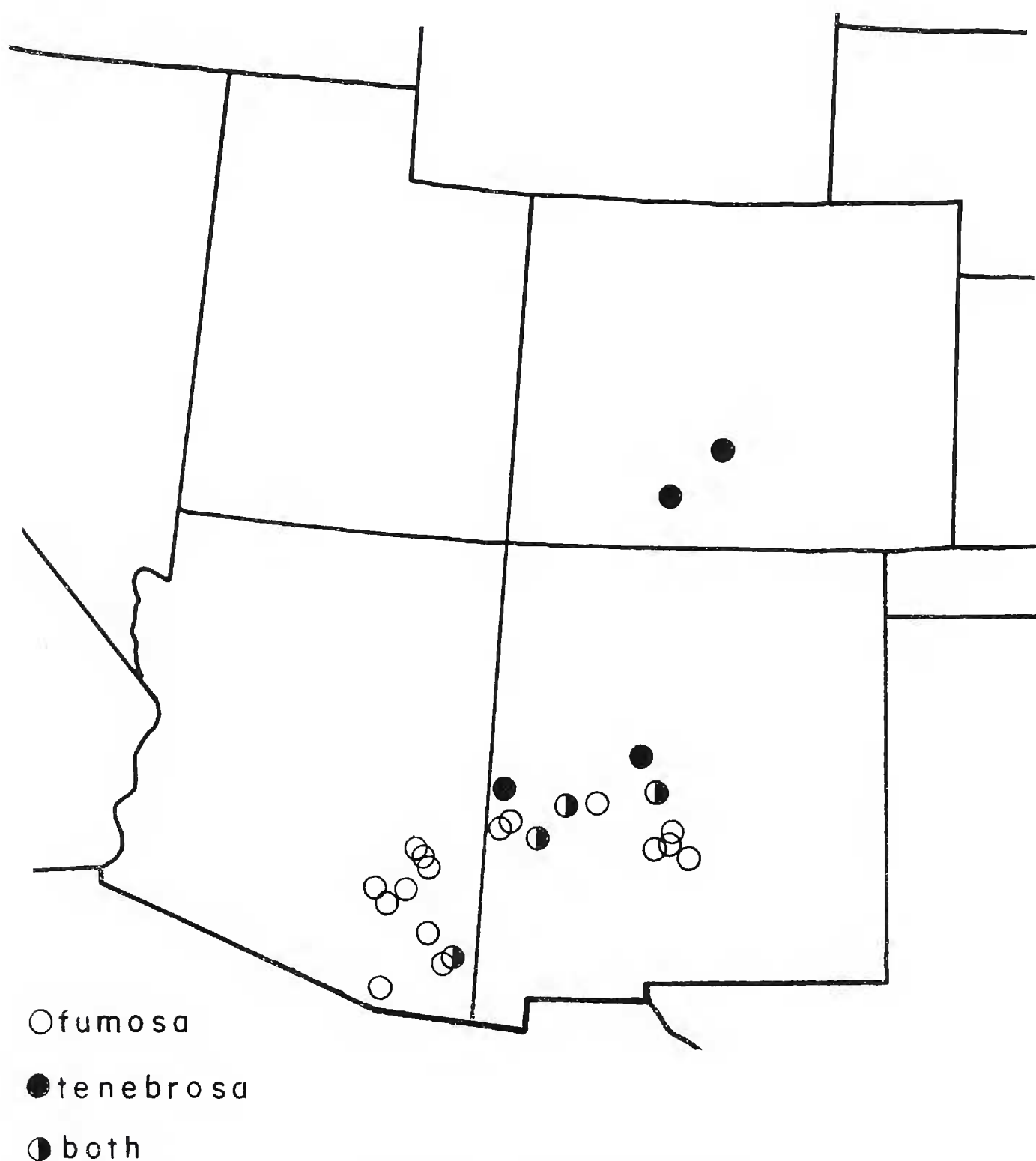


Figure 1. Distribution of *Kaestneriella fumosa* (Banks) and *K. tenebrosa* n. sp.

approximately 30° to basal two-thirds. Endophallic sclerites (Fig. 4) two lateral groups joined together anteriorly by broad ribbon-like sclerite; each lateral group consisting of basal blade joined to broad lateral shaft bearing two rounded lobes on its median surface and terminating distally as a slightly medially bent blade. Clunial margin before epiproct (Fig. 5) indented medially, 16–18 denticles in marginal row, 9–10 smaller denticles in submarginal row ($n = 4$). Knobbed setae of paraproct long and slender (Fig. 6).

Female. — Measurements in Table 1. *Color*: As male, but head largely pale tan with medium brown spots on vertex bordering median ecdysial line, posterior head margin, and median edges of compound eyes; rings of subcuticular pigment of abdomen darker; terminal abdominal segments more extensively medium to dark brown. Forewings as Fig. 7. *Structural characters*: R_s index = 1.21–1.35 ($\bar{x} = 1.28$, $n = 3$). Subgenital plate (Fig. 8) with small, darkly pigmented central area; arms broad medially tapering to blunt ends; anterior indentation shallow; posterior process length approximately equalling basal width, tapering to bilobed tip, lobes bearing two or three long and several short setae. Ovipositor valvulae (Fig. 9): first valvula slender, slightly upturned at tip, distal one-third bearing numerous minute spines; second valvula with numerous short articulated spines and four to seven long setae along distal margin, wide unpigmented area bordering median margin near base; third valvula with

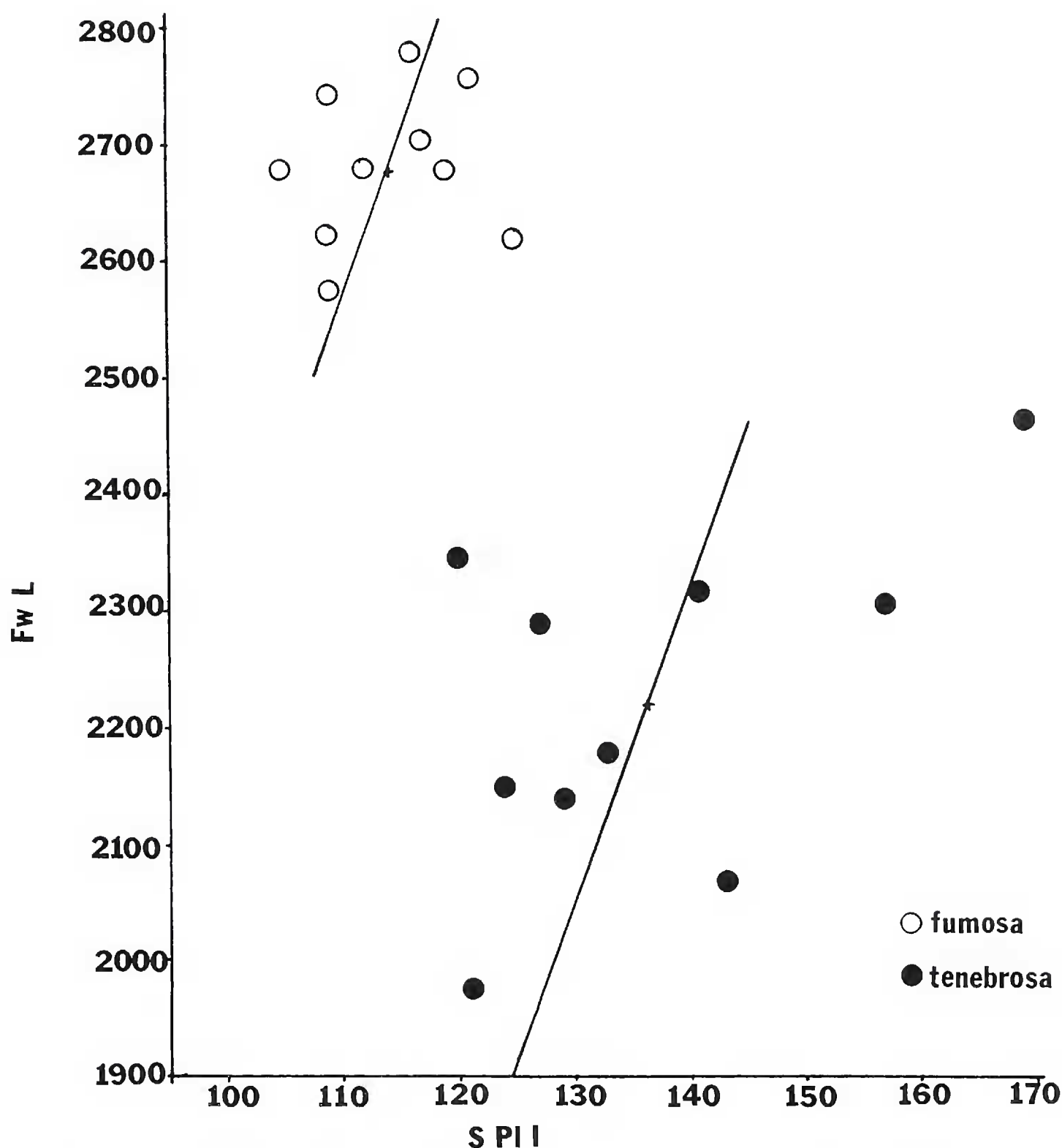
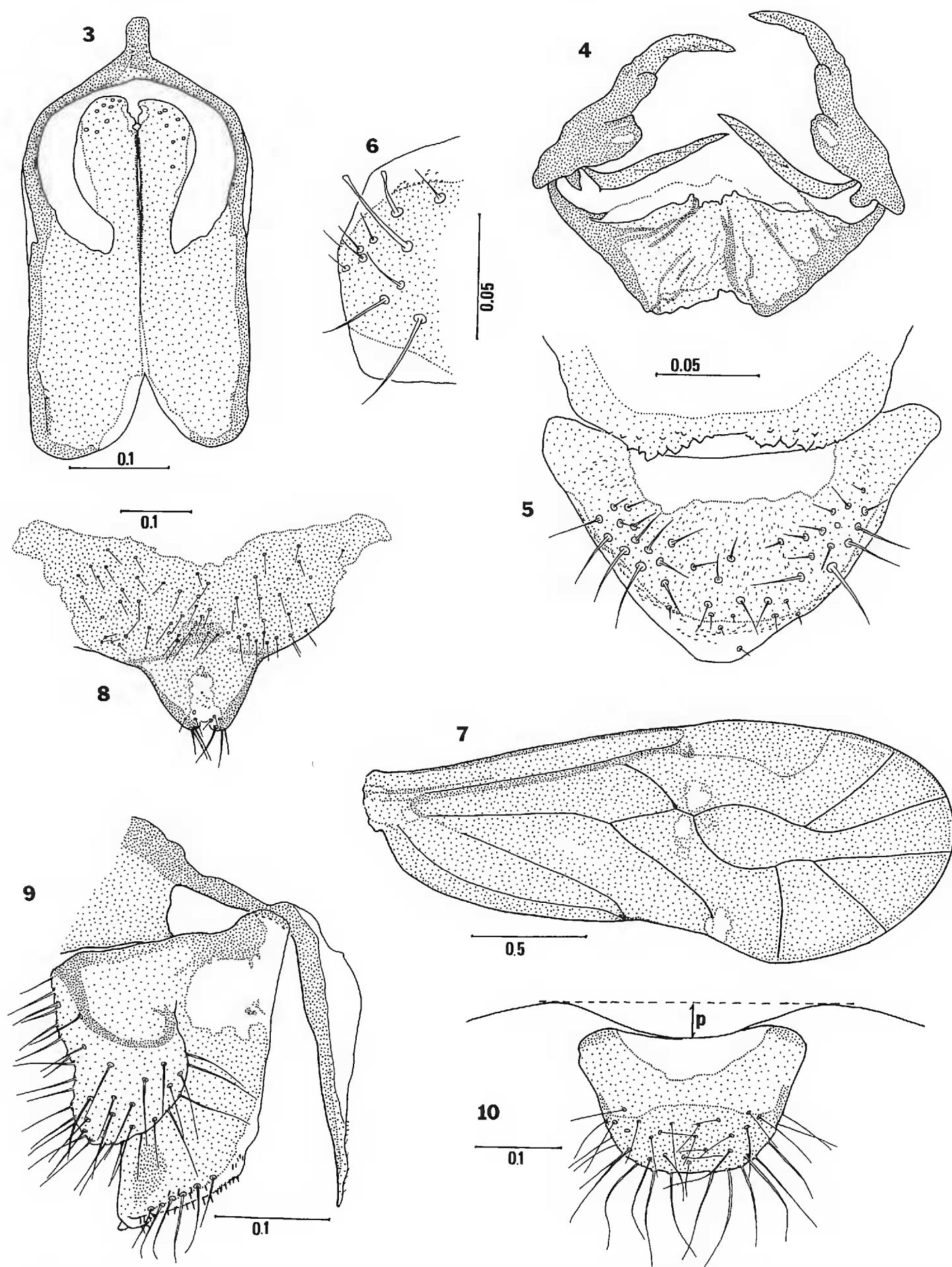


Figure 2. Scattergram of forewing length (vertical axis, FwL) plotted against subgenital plate indentation (horizontal axis, S Pl I) for two species of *Kaestneriella*. Regression lines fitted by Bartlett method (Simpson et al. 1960). units = μm .

21–24 marginal setae ($n = 3$, 6 valvulae), ve/vd (Badonnel 1986) = 0.68–0.74 ($n = 3$). Clunial protrusion (Fig. 10) moderate.

Diagnosis. — See key for diagnostic traits.

Remarks. — Note that the type locality “southwestern Colorado” although vague, would appear to be at least 250 km outside the present distribution of the species, as established by the above data. This observation has several possible explanations. First, the collector of the type erroneously recorded the locality of collection. Second, the species is present in southwestern Colorado, but was not found in our sampling. Third, the range of the species has shifted southward during the minimum of 82 years between collection of the type and most of our sampling. Thorpe (1970) has indicated considerable doubt about some of the



Figures 3–10. Structures of *Kaestneriella fumosa*. Figure 3. Phallosome of male. Figure 4. Endophallus of male (scale of Fig. 5). Figure 5. Epiproct and posterior margin of clunium before epiproct of male. Figure 6. Distal end of paraproct of male showing clubbed setae. Figure 7. Forewing of female. Figure 8. Subgenital plate of female. Figure 9. Ovipositor valvulae of female. Figure 10. Epiproct and posterior margin of clunium of female; p = clunial protrusion. Scales in mm.

collection localities of E. J. Osler. Thus, the first possible explanation seems most likely.

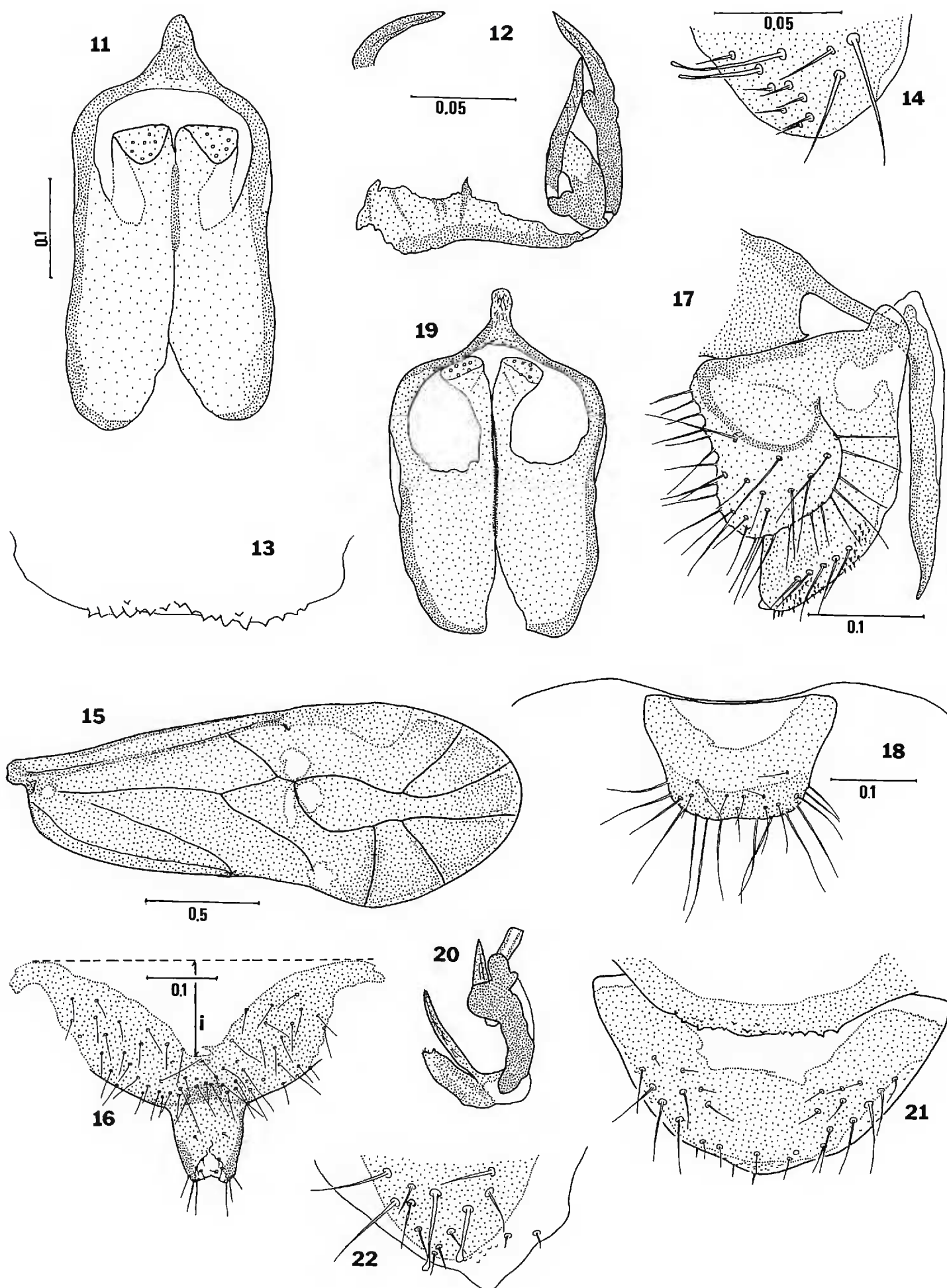
Material Examined.—(D. M. Sullivan collector unless otherwise indicated). ARIZONA. COCHISE Co.: 6.4 km SW of Paradise, 1570 m, 7 Sep 1984, beating *Pinus leiophylla chihuahuana* Engelm., *Juniperus deppeana* Steudel, *Cupressus arizonica* Greene, *Quercus arizonica* Sargent, *Acacia greggii* Gray, *Vitis arizonica* Engelm., *Salix* sp., dead branches of *Quercus* sp. with hanging dead leaves, 5 males, 18 females; Portal, 6 Sep 1960, *Quercus emoryi* Torrey, H. F. Howden, 1 female; Chiricahua Mts, 19.3 km NW of Rustler Park, U.S. Forest Service rd 142, 1829 m, 10 Sep 1984, beating general vegetation, 4 females; Chiricahua Mts, Welch Seep, 1890 m, 8 Sep 1984, beating dead branches of *Quercus* sp. with hanging dead leaves, 2 males, 4 females. GRAHAM Co.: Pinaleno Mts, hwy 366, 32.2 km W of Prison, 1859 m, 12 Aug 1985, beating *Q. emoryi*, *Q. hypoleucodes* Camus, 1 male, 3 nymphs; Pinaleno Mts, below Turkey Flat, 2195 m, 16 Aug 1985, beating *Abies grandis* (Douglas) Lindley, *Acer grandidentatum* Nuttall, 2 males, 1 female, 3 nymphs; Pinaleno Mts, 20.9 km W of hwy 666 on hwy 366, 2210 m, 16 Aug 1985, beating *Quercus rugosa* Nye, 1 female, 2 nymphs. PIMA Co.: ca. 64 km NE of Tucson, Santa Catalina Mts, 1631 m, 19 Aug 1985, beating *Q. rugosa*, *C. arizonica*, 4 males, 2 females, 16 nymphs; Santa Catalina Mts, General Hitchcock Campgd, 1829 m, 20 Aug 1985, beating *J. deppeana*, *Quercus grisea* Liebm., *Juglans major* (Torrey) Heller, 3 males, 3 females, 14 nymphs; Santa Catalina Mts, Rose Canyon Lake, ca. 48 km NE of Tucson, 2103 m, 21 Aug 1985, beating *Alnus oblongifolia* Torrey, *Q. hypoleucodes*, 2 males, 3 females, 33 nymphs. SANTA CRUZ Co.: hwy 289, 9.1 km NW of hwy I-19, 23 Jul 1975, beating dead branches of *Quercus* sp., E. L. Mockford, 1 female; Patagonia Mts, 24.1 km S of Patagonia, 27 Aug 1959, beating *Quercus* limbs, G. H. Nelson, 1 female; Santa Rita Mts, Madera Canyon, 21 Aug 1959, on *Quercus* sp., G. H. Nelson, 1 female. NEW MEXICO. CATRON Co.: Continental Divide nr Elk Mountain, 2316 m, 19 Sep 1984, beating *J. deppeana*, 1 female; jct hwy 28 and hwy 78, 2499 m, 19 Sep 1984, beating *J. deppeana*, 2 females; Negrito Creek at U.S. Forest Service rd 141, 2438 m, 16 Sep 1984, beating *Q. emoryi*, *Q. gambelii* Nuttall, *J. deppeana*, 1 male, 7 females; jct hwy 180 and hwy 12, 1951 m, 15 Sep 1984, beating *Q. emoryi*, 1 female; 48 km SW of Reserve, Pueblo Park Campgd, Gila Nat'l Forest, 1905 m, 8 August 1985, beating *Q. chrysolepis* Liebm., 1 female. LINCOLN Co.: Capitan Gap rd 56, 9–10.5 km N of hwy 380, 2134–2286 m, 11 Aug 1983, beating *Quercus turbinella* Greene, *Pinus ponderosa* Lawson, *Pinus cembroides* Zuccarini, E. L. Mockford and J. M. Sullivan, 1 male, 6 females; Capitan Mts, 2195 m, 2 Sep 1984, beating *P. cembroides*, *Q. emoryi*, *Q. grisea*, 4 males, 7 females, 10 nymphs; Capitan Mtn, 2164 m, 3 Sep–19 Oct 1984, beating *P. cembroides*, *J. deppeana*, 2 males, 2 females; 24 km NE of Capitan Town, 2134 m, 11 Aug 1983, beating *P. cembroides*, *Quercus* sp., 1 male, 4 females; Rio Hondo Crk, 8 km NE of Capitan Town, 1951 m, 5 Sep 1984, beating dead hanging leaves of perennial plant, 1 male. TORRANCE Co.: Manzano Mts, Red Canyon Campgd, 2438 m, beating *Abies concolor* Lindley, *Robinia neomexicana* Gray, E. L. Mockford and D. M. Sullivan, 3 females.

KAESTNERIELLA TENEBROSA MOCKFORD & SULLIVAN, NEW SPECIES

Types.—Holotype female. COLORADO. TELLER Co.: ca. 32 km S of Victor, 2499 m, 9 Sep 1985, beating *P. ponderosa*. Paratypes: 8 females, same data as holotype, 4 females same locality and date as holotype, beating *A. concolor*.

Male.—Measurements in Table 1. *Color:* Head as *K. fumosa* except: diffuse medium brown spots along median ecdysial line and bordering eyes medially; paler cream tan between spots, around ocellar interval and between postclypeal striations. Body, wings as *K. fumosa*. *Structural Characters:* R_s index = 1.29 ($n = 1$). Phallosome (Fig. 11, distorted in mounting) as *K. fumosa*; tips of pore-bearing parameres bent forward, pores visible on reflexed portion; apical beak with portion basal to bend relatively short, rounded. Endophallic sclerites (Fig. 12) as *K. fumosa* but basal ribbon-like sclerite more slender, longer transversely. Clunial margin before epiproct (Fig. 13) indented medially, 16 small denticles in marginal row, two minute denticles submarginally ($n = 1$). Knobbed setae long, slender, knobs only slightly developed (Fig. 14).

Female.—Measurements in Table 1. *Color:* As *K. fumosa* except wings brighter red-brown; abdominal pigment rings darker, not interrupted ventrally in basal half of abdomen on darker individuals. Forewing as Fig. 15. *Structural Characters:* R_s index = 1.19–1.27 ($\bar{x} = 1.24$, $n = 3$). Subgenital plate (Fig. 16) with small, darkly pigmented central area, arms relatively broad medially, tapering usually



Figures 11–22. Structures of *Kaestneriella tenebrosa* and *K. setosa*. Figure 11. *K. tenebrosa*, phallosome of male. Figure 12. *K. tenebrosa*, endophallus of male (complete sclerites of right side, right half of basal connecting piece, left distal prong). Figure 13. *K. tenebrosa*, posterior margin of clunium before epiproct of male (scale of Fig. 12). Figure 14. *K. tenebrosa*, distal end of paraproct of male showing clubbed setae. Figure 15. *K. tenebrosa*, forewing of female. Figure 16. *K. tenebrosa*, subgenital plate of female; i = indentation. Figure 17. *K. tenebrosa*, ovipositor valvulae of female. Figure 18. *K. tenebrosa*, epiproct and posterior edge of clunium of female. Figure 19. *K. setosa*, phallosome of male (scale of Fig. 11). Figure 20. *K. setosa*, right endophallic sclerites of male (scale of Fig. 12). Figure 21.

to slender tips laterally; median indentation deep; distal process as *K. fumosa* but tapering only slightly distally. Ovipositor valvulae (Fig. 17) as *K. fumosa*. but basal marginal unpigmented area of v_2 less broad, $ve/vd = 0.65-0.70$ ($n = 3$). Clunial protrusion (Fig. 18) slight.

Diagnosis.—See key for diagnostic traits.

Material Examined.—ARIZONA. COCHISE Co.: ca. 6.4 km SW of Paradise, 1600 m, 8 Sep 1984, beating *Arctostaphylos patula* Greene, 1 female. COLORADO. MINERAL Co.: ca. 32 km NE of Pagosa Springs, 2469 m, 19 Aug 1983, beating *Pseudotsuga taxifolia* Britton, 1 male (?). NEW MEXICO. CATRON Co.: ca. 16 km SE of Reserve, U.S. Forest Service rd 141, 2195 m, 15 Sep 1984, beating *P. ponderosa*, 1 female; ca. 32 km E of Alpine, hwy 180, 2195 m, 15 Sep 1984, beating *P. ponderosa*, 1 female; Continental Divide nr Elk Mountain, 2316 m, 19 Sep 1984, beating *J. deppeana*, 1 female; Negrito Crk and U.S. Forest Service rd 141, 2286 m, 17 Sep 1984, beating live branch tips of *Picea englemannii* Parry, 1 female. VALENCIA Co.: Lobo Cyn Cibola Nat'l Forest, 2316 m, 23 Sep 1984, beating *P. ponderosa*, 1 female.

KAESTNERIELLA SETOSA MOCKFORD & WONG

Kaestneriella setosa Mockford & Wong (1969: 243).

The male reported by Mockford & Wong (1969) as this species is a distinct undescribed species. Two males of another species collected in the same area (nr Tuxtla, southern Veracruz) are more probably *K. setosa*, based on: (1) one of the present males was collected with females of *K. setosa*, (2) they are of similar color and size with female *K. setosa* (the male reported was teneral so color comparison could not be made), (3) the previously assigned male has only a single seta on the anal cell of the forewing posterior margin and one male of the present species has five (a condition closer to the possible 11–19 of female *K. setosa*).

Genitalic features of the male now assigned to *K. setosa* are shown in Figs. 20–22, and measurements are in Table 1.

The record of *K. setosa* from Sinaloa (Mockford & Wong 1969: fig. 57, northernmost record) is erroneous; Badonnel (1986) correctly noted it represents *K. similis* Badonnel. The record of that species from El Tuito, Jalisco, attributed by Badonnel to Mockford & Wong (1969) was made in 1980 and does not appear on Mockford & Wong's map.

New Records.—MEXICO. VERACRUZ: 10.4 km NW of Santiago Tuxtla on rd to El Vigía, 13 Jul 1973, beating broad-leaf trees, J. R. Taber, 1 male; 20.7 km NE of San Andres Tuxtla on rd to Cerro San Martin, 14 Jul 1973, beating shrubs and log, J. R. Taber, 1 male, 3 females.

KEY TO SPECIES OF *KAESTNERIELLA*

This key modifies that of Mockford & Wong (1969), including new forms and correcting an error in couplet 8; see Mockford & Wong (1969) for illustrations in couplets.

1. Forewing ciliation consisting of minute sparse setae on veins, anterior margin, and surface of pterostigma; marginal setae visible only above 70 \times ; large setae, if any, limited to veins R and part of R_1 forming posterior margin of pterostigma 7

←

K. setosa, epiproct and posterior margin of clunium in middle of male (scale of Fig. 12). Figure 22.
K. setosa, distal end of paraproct of male showing clubbed setae (scale of Fig. 14). Scales in mm.

- Forewing ciliation as above but consisting of abundant setae readily visible at 70× 2
- 2(1). Postclypeus marked with a conspicuous pair of large spots formed by the striations *K. maculosa* Mockford & Wong
- Postclypeus with no conspicuous markings 3
- 3(2). Small species, forewings 2.0–2.8 mm; relatively slight sexual dimorphism in wing length (extent unknown for *K. pilosa* Roesler) 4
- Larger species, male forewing approximately 4.0 mm; marked sexual dimorphism in wing length, wings of female extending only to seventh abdominal segment at rest (known only above 2800 m, Guatemala) *K. guatemalensis* Mockford & Wong
- 4(3). Forewing 1.57–2.28 mm (El Salvador, north to southern Mexico and Pacific lowlands north to Sinaloa) 6
- Forewing approximately 2.5–2.8 mm 5
- 5(4). Principal endophallic sclerites a pair of stout hook-shaped structures (Roesler 1943: fig. 13); male forewing approximately 2.5 mm (Costa Rica) *K. pilosa* Roesler
- Principal endophallic sclerites a complex pair of structures: elongate, slender process attached basally to stouter process bearing 3 blades; male forewing approximately 2.5 mm, that of female 2.4 mm (Ecuador) *K. ecuatoriana* Garcia Aldrete
- 6(4). Setae absent on hind margin of anal cell on forewing (Pacific lowlands of Mexico from Jalisco to Sinaloa) *K. similis* Badonnel (female)
- Hind margin of anal cell in forewing with 5–19 setae (El Salvador, north to Tuxtla, southern Veracruz) *K. setosa* Mockford & Wong (both sexes)
- 7(1). Major endophallic sclerites (male) a simple pair of hook-shaped structures with a small, rounded sclerite lateral to base of each hook (Mockford & Wong 1969; figs. 14, 17, 21); dark central region of subgenital plate (female) diffuse, conspicuously constricted medially, or divided in two 8
- Major endophallic sclerites two or three pairs of prongs; dark central region of subgenital plate entire or very slightly constricted medially 11
- 8(7). Distinct pair of large spots on clypeus present, formed by striations *K. minor* Mockford & Wong
- Clypeus lacking distinct marks 9
- 9(8). Forewing of both sexes uniformly tawny brown on distal one-third; forewing of male ≤ 2.10 mm long 10
- Female forewing darker in cells R_1 – R_3 , M_1 – M_3 but male as above; forewing of male ≥ 2.78 mm long ... *K. obscura* Mockford & Wong
- 10(9). Inconspicuous forewing ciliation (both sexes); arm of each major endophallic sclerite acuminate distally with broadly attached median lobe (male) (Mockford & Wong 1969: fig. 17) *K. pacifica* Mockford & Wong
- Males (females keyed in couplet 6); setae short but numerous on veins R and R_1 of forewing including posterior margin of pterostigma; arm of each major endophallic sclerite blunt distally, with narrow

- attachment of median lobe (Badonnel 1986: fig. 61)
 *K. similis* Badonnel (male)
- 11(7). Each major endophallic sclerite with three pointed prongs (Mockford
 & Wong 1969: figs. 26, 29) 12
- Middle “prong” of each major endophallic sclerite a rounded lobe 13
- 12(11). Middle prong of each major endophallic sclerite shorter and stouter
 than basal prong (Mockford & Wong 1969: fig. 29); a distinct dark
 spot just distad of colorless spot in base of cell R_5 of forewing ..
 *K. occidentalis* Mockford & Wong
- Middle prong of each major endophallic sclerite long and slender,
 differing little from basal prong (Mockford & Wong 1969: fig. 26);
 region just distad of colorless spot in base of cell R_5 concolorous
 with surrounding tawny membrane *K. mexicana* Mockford & Wong
- 13(11). Female forewing length 1.99–1.52 mm; median indentation of pig-
 mented area of subgenital plate relatively deep (fig. 16). Eyes of
 (presumed) male relatively small ($IO/d = 1.48$)
 *K. tenebrosa* NEW SPECIES
- Female forewing length > 2.52 mm; median indentation of pigmented
 area of subgenital plate relatively shallow (Fig. 8). Eyes of male
 relatively large ($IO/d = 0.70$ – 0.96) *K. fumosa* (Banks)

ACKNOWLEDGMENT

We thank: S. R. Shaw (Museum of Comparative Zoology, Cambridge, Massachusetts) and J. E. H. Martin (Canadian National Collection, Ottawa, Ontario) for arranging the loan of specimens; J. K. Bouseman (Illinois Natural History Survey, Champaign) for discussion and reference to Thorpe (1970); the Illinois Field Entomologists Club and the Illinois State University Chapter of Phi Sigma for grants covering DMS's field work in part.

LITERATURE CITED

- Badonnel, A. 1986. Psocoptères (Insecta) de la bordure pacifique de l'Etat de Jalisco, Mexique. *Revue Suisse Zool.*, 93: 693–723.
- Banks, N. 1903. Some new Neuropteroid insects. *J. N.Y. Entomol. Soc.*, 11: 236–243.
- García Aldrete, A. N. 1989. Descripción de una especie nueva de *Kaestneriella* (Psocoptera: Peripsocidae) de Ecuador. *Anales Inst. Biol. Univ. Nal. Autón. Mexico, Ser. Zool.*, 59: 53–58.
- Mockford, E. L. 1989. *Xanthocaecilius* (Psocoptera: Caeciliidae), a new genus from the Western Hemisphere: I. description, species complexes, and species of the *quillayute* and *granulosus* complexes. *Trans. Am. Entomol. Soc.*, 114: 265–294.
- Mockford, E. L. & S. K. Wong. 1969. The genus *Kaestneriella* (Psocoptera: Peripsocidae). *J. N.Y. Entomol. Soc.*, 77: 221–249.
- Roesler, R. 1943. Über einige Copeognathengenera. *Stett. Entomol. Zeit.*, 104: 1–14.
- Simpson, G. G., A. Roe, & R. C. Lewontin. 1960. *Quantitative Zoology* (Revised ed.). Harcourt, Brace, New York.
- Thorpe, R. 1970. The type locality of *Bombus franklini* and notes on putative Arizona records of other Bombini. *Pan-Pacif. Entomol.*, 46: 177–180.

Received 14 July 1989; accepted 24 September 1990.